Computer Skills For Preparatory Programs "**Applied1 Track**"

CS 051

Chapter 2
Looking at Computers:
Understanding the Parts

Chapter Objectives

After reading this chapter, you should be able to answer the following questions:

- What exactly is a computer, and what are its four main functions?
- What is the difference between data and information?
- What are bits and bytes, and how are they measured?
- What devices do I use to get data into the computer?
- What devices do I use to get information out of the computer?
- What's on the motherboard?
- Where are information and programs stored?
- How are devices connected to the computer?
- How do I set up my computer to avoid strain and injury?

Chapter Topics

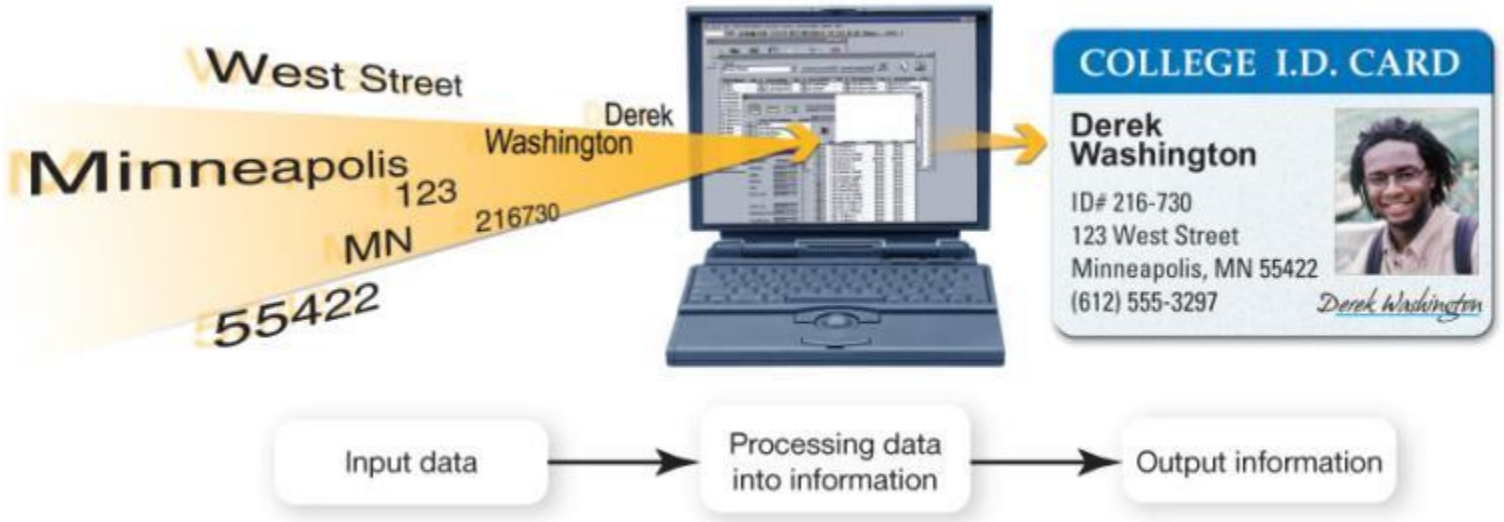
- Functions of a computer
- Data versus information
- Bits and bytes
- Input devices
- Output devices
- Processing
- Storage
- Ergonomics

Computers Are Data Processing Devices

- A computer's four major functions:
  - Gathers data (users input data)
  - Processes data into information
  - Outputs data or information
  - Stores data and information

Data vs. Information

- Data: Representation of a fact, figure, or idea
- Information: Organized, meaningful data



Bits and Bytes: The Language of Computers

- Bit
  - Binary digit
  - 0 or 1
- Byte
  - 8 bits
- Each letter, number, and character = a string of eight 0s and 1s

0000 1111

How Much Is a Byte?

Name	Abbreviation	Number of Bytes	Relative Size
Byte	B	1 byte	Can hold one character of data.
Kilobyte	kB	1,024 bytes (2^{10} bytes)	Can hold 1,024 characters or about half of a double-spaced typewritten page.
Megabyte	MB	1,048,576 bytes (2^{20} bytes)	Can hold approximately 768 pages of typed text.
Gigabyte	GB	1,073,741,824 bytes (2^{30} bytes)	Approximately 786,432 pages of text; 500 sheets of paper is approximately 2 inches, so this represents a stack of paper 262 feet high.
Terabyte	TB	1,099,511,627,776 bytes (2^{40} bytes)	This represents a stack of typewritten pages almost 51 miles high.
Petabyte	PB	1,125,899,906,842,624 bytes (2^{50} bytes)	The stack of pages is now 52,000 miles high, or approximately one-fourth the distance from the Earth to the moon.
Exabyte	EB	1,152,921,504,606,846,976 bytes (2^{60} bytes)	The stack of pages is now 52 million miles high, or just about twice the distance between the Earth and Venus.
Zettabyte	ZB	1,180,591,620,717,411,303,424 bytes (2^{70} bytes)	The stack of pages is now 52 billion miles high, some 20 times the distance between the Earth and Pluto.

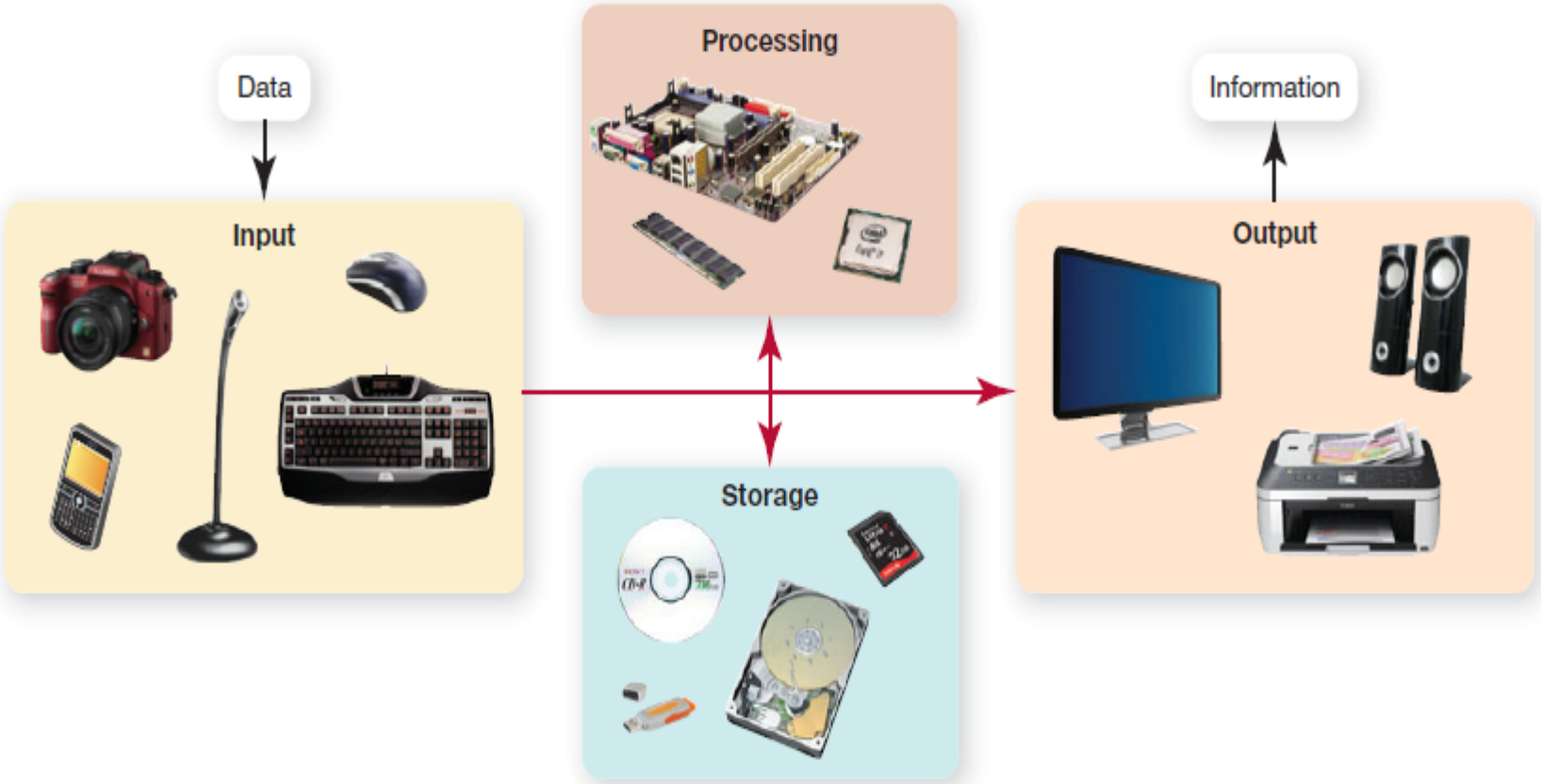
Computer Software

- Software: Programs that enable hardware to perform different tasks
  - Application software
  - System software

Computer Hardware

Hardware: Any part of the computer you can touch

Each part of the computer serves a special function.



Types of Computers

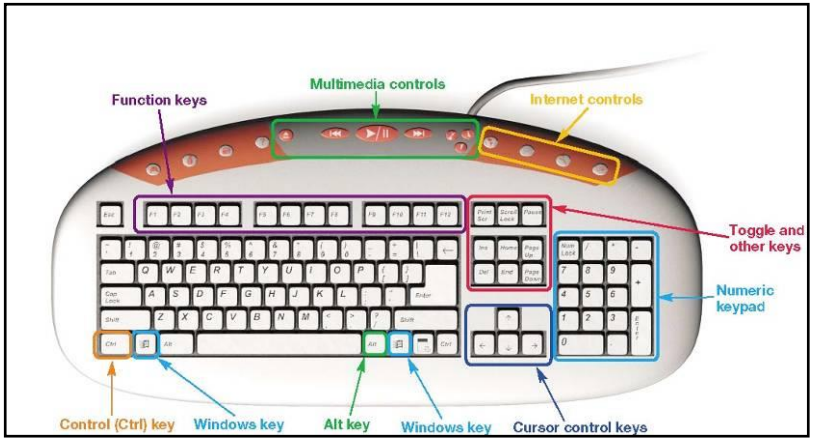
- Notebook: Portable computer
- Desktop: Used at a single location
- Mainframe: Supports hundreds of users simultaneously
- Supercomputer: Performs complex calculations rapidly
- Embedded: Self-contained computer performing dedicated functions

Input Devices

- Devices used to enter information or instructions into the computer
  - Keyboard
  - Mouse/ pointing device
  - Stylus
  - Scanner
  - Digital camera
  - Microphone

Keyboards

- The QWERTY layout is standard on most PCs.
- Enhanced keyboard features include number, function, and navigation keys.

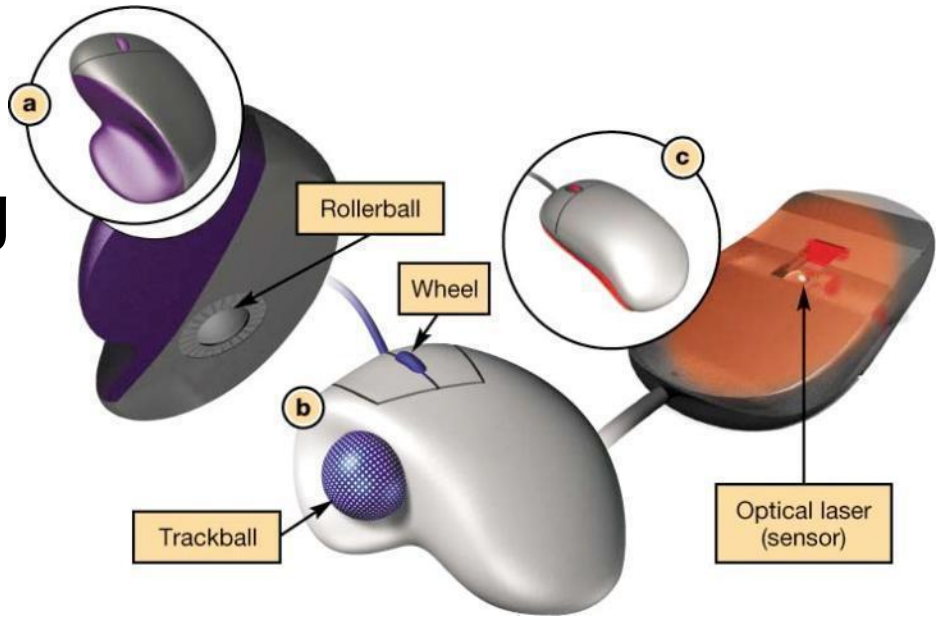


Specialty Keyboards

- Notebook keyboard
- PDA stylus
- Tablet PCs
- Wireless keyboard

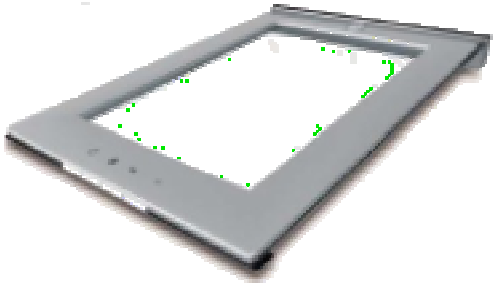
Mice

- Optical mouse
  - Needs no mouse pad
  - Doesn’t need cleaning
  - Is more expensive
- Trackball
  - Easier on wrists
  - Stays stationary on desk
- Wireless
  - Uses radio or light waves



Other Input Devices

- Scanners
  - Text
  - Images
- Digital cameras
  - Images
  - Video



Flatbed scanner

Handheld scanner

Digital camera

Camcorder

Other Input Devices

- EPOS Digital Pen
- Webcam
  - Live video

Inputting Sound

- Microphones are used for:
  - broadcasts
  - Video-conferencing
  - Internet phone calls
  - Speech recognition

Input Devices for the Physically Challenged

- Visual impairments
  - Voice recognition
  - Keyboards with large keys
  - On-screen keyboards
- Motor control issues
  - Special trackballs
  - Head-mounted devices

Output Devices

- Send processed data out of the computer
  - Monitors
  - Printers
- Output devices make:
  - Soft copies (video, sounds, control signals)
  - Hard copies (print)

Monitor Types

- CRT (Cathode-Ray Tube)
  - Less expensive
  - Uses much more space
  - Uses more energy
  - Offers better viewing angles
  - Legacy technology
- LCD (Liquid Crystal Display)
  - More expensive
  - Uses far less space
  - More energy efficient
  - Less viewable from an angle

LCD Monitor Features

- Screens are grids made up of millions of pixels
- Each pixel is composed of red, blue, and green subpixels
- Liquid crystal is sandwiched between two transparent layers to form images

LCD Quality Factors

- Resolution
- Viewing angle
- Contrast ratio
- Brightness
- Response time

Other Video Output

- Touch-screen monitors
  - Double as both input and output devices
- Projectors
  - Project a computer image to a large screen for sharing with large groups

Printers

- Impact printers
  - Dot-matrix
- Nonimpact printers
  - Inkjet
  - Laser
- Specialty printers
  - Multifunction(all in one)
  - Plotters
  - Thermal printers

Nonimpact Printers

- Inkjet
  - Less expensive device
  - Print high-quality color images cost effectively

- Laser
  - More expensive device
  - Faster printing speed
  - Less expensive per page in B&W
  - Color lasers are becoming less expensive

Choosing a Printer

- Speed (ppm)
- Resolution (dpi)
- Color output
- Memory
- Use and cost
- Cost of consumables

Outputting Sound

- Speakers and headphones

The System Unit

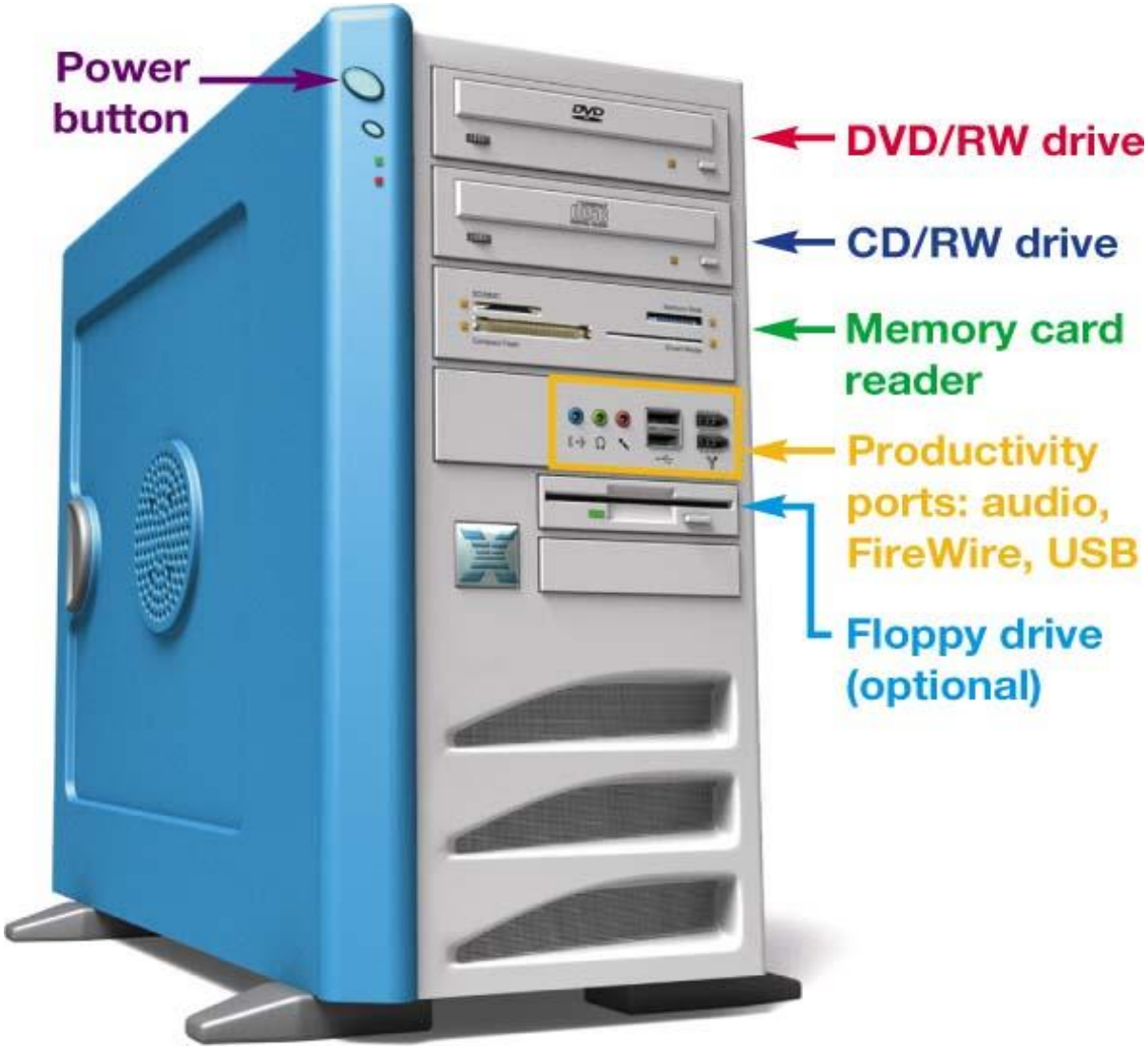
- Box that contains the central electronic components of the computer:
  - CPU/RAM/ motherboard
  - Expansion cards
  - Power supply
  - Storage devices

RAM vs. ROM

- Random access memory (RAM):
  - Stores instructions and data
  - Temporary (volatile) storage
  - Consists of several memory cards or modules
- Read-only memory (ROM):
  - Stores start-up instructions
  - Permanent storage

The Front Panel

- Power control
- Drive bays
- Memory card reader
- Productivity ports



Power Controls

- Power-on button: Turns on system, should not be used to turn it off
- Other options:
  - Sleep mode
  - Hibernation

Drive Bays

- Internal drive bays:
  - Cannot be access from outside the system
  - Are reserved for internal hard drives
- External drive bays:
  - Can be accessed from outside the system
  - CD or DVD drives
  - Floppy and zip drives

Hard Disk Drive

- Permanent (nonvolatile) storage
- Internal or external versions

Flash Drives/Flash Memory

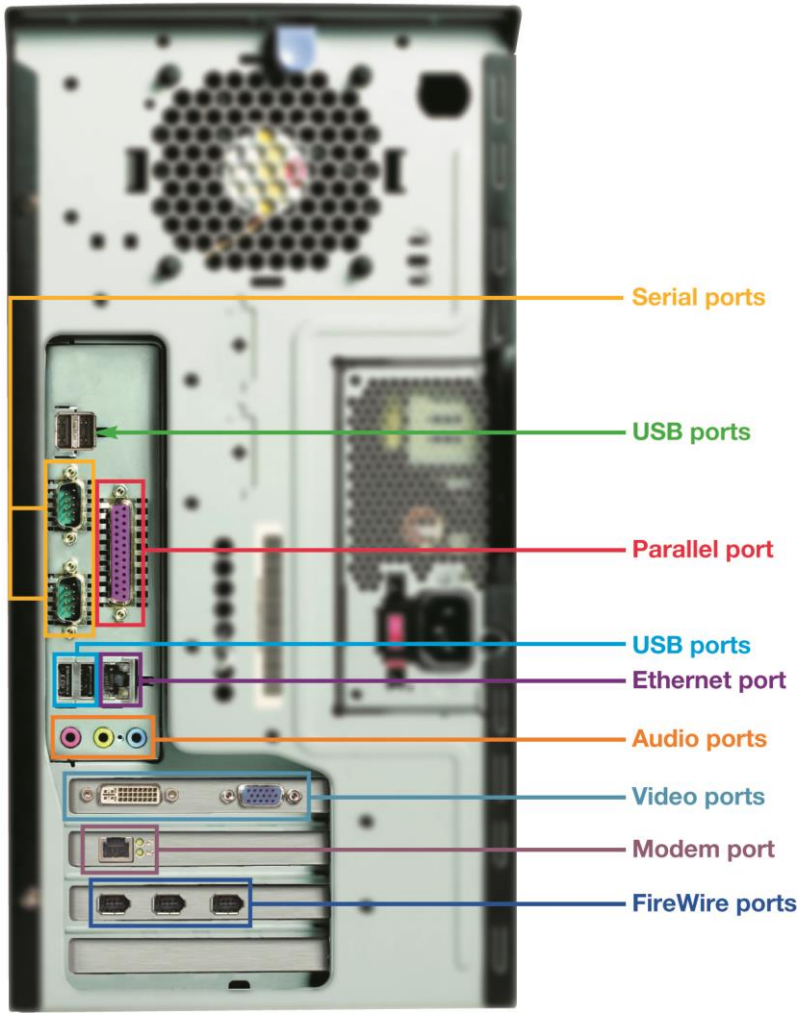
- Flash drives (jump drives)
  - Newer storage alternative
  - Plug into USB ports
- Flash memory cards
  - Slide into slots in the system

Storage Media Capabilities

STORAGE MEDIUM	CAPABILITIES	STORAGE CAPACITY
Hard Drive	Read and write	External: as much as 2 terabytes (TB) Internal: as much as 750 GB
CD CD-RW CD+RW	Read only Read and write	700 MB
DVD DVD-RW DVD+RW	Read only Read and write	4.7 GB (for single-side, single-layer DVDs) 9.4 GB (for single-side, dual-layer DVDs)
Blu-ray (BD)	Read and write	27 GB (for single-layer discs) 50 GB (for dual-layer discs)
Flash memory cards	Read and write	16 GB or more
Flash drive	Read and write	16 GB or more

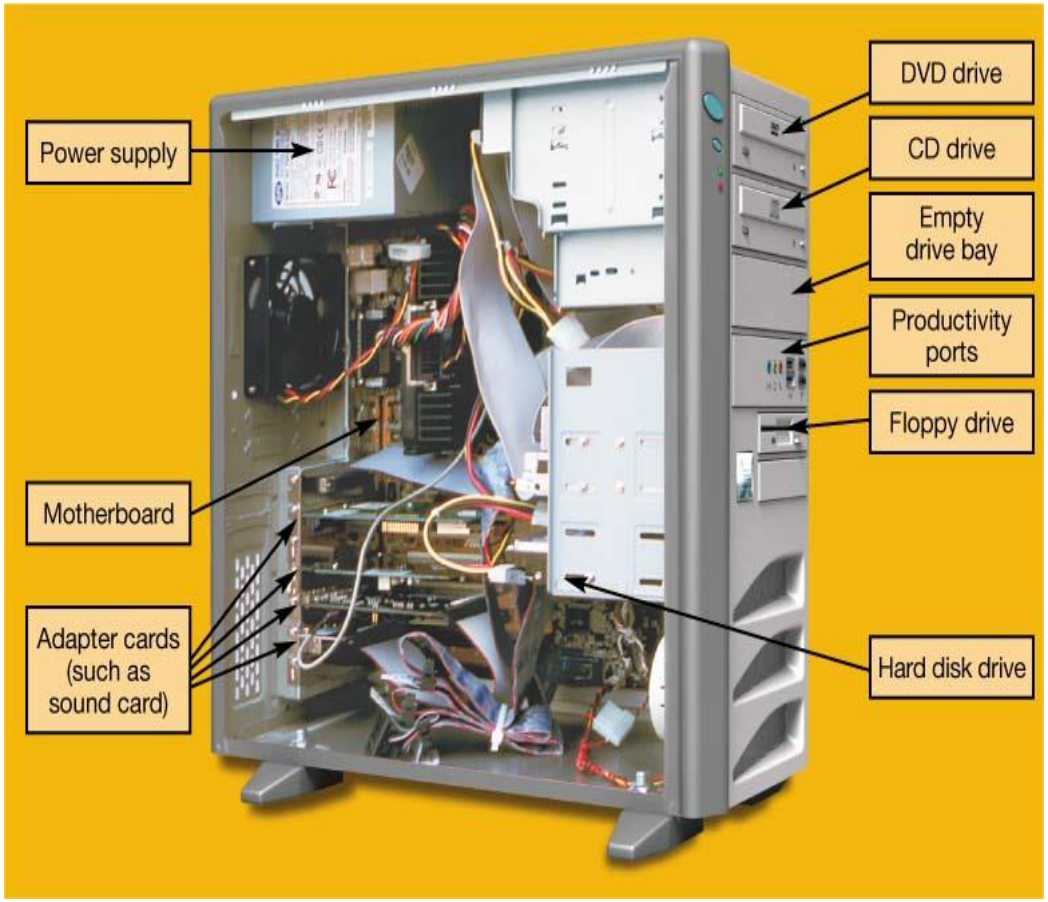
On the Back

- Ports for peripherals
- Types of ports:
  - Serial and parallel
  - Audio and video
  - USB
  - FireWire
  - Connectivity
    - Ethernet
    - Modem



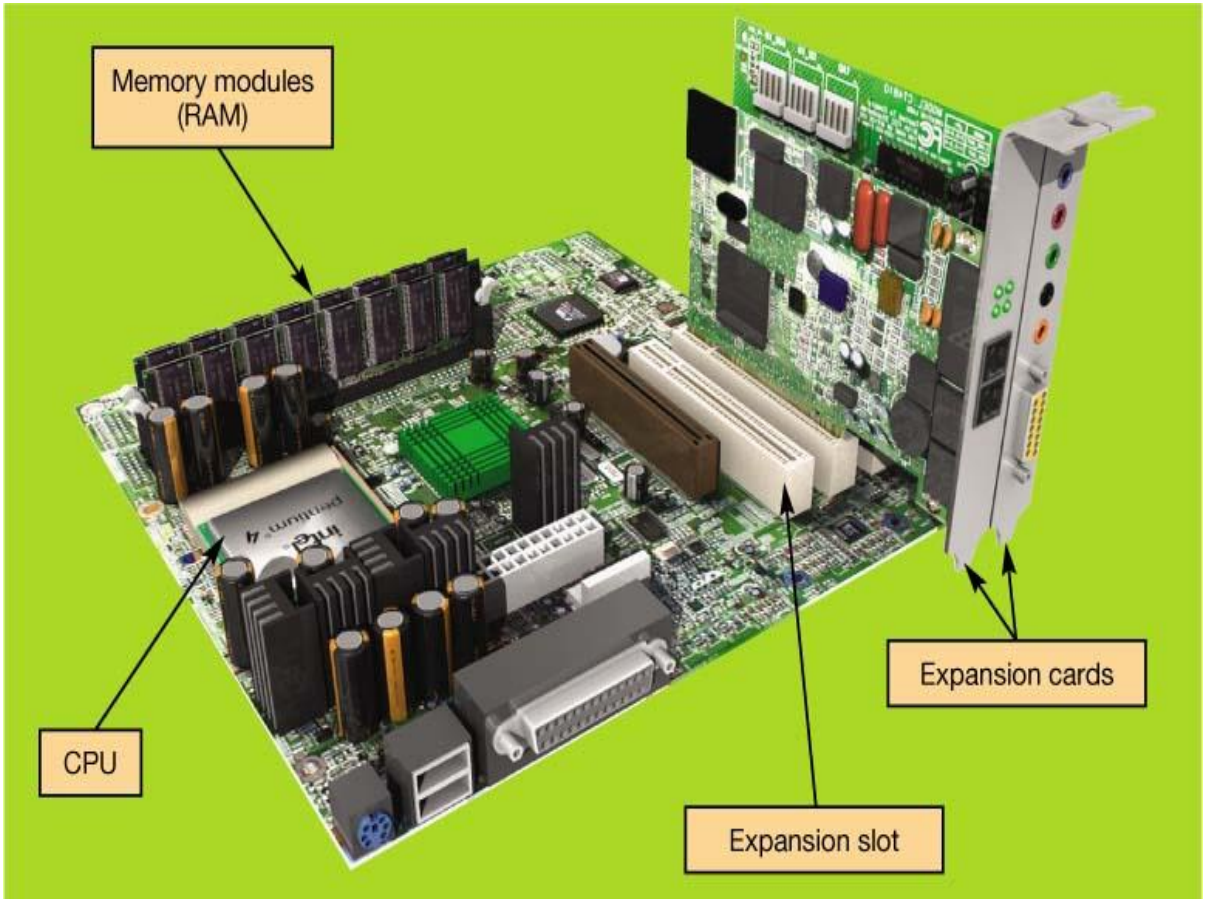
Inside the System Unit

- Essential electronic components used to process data
- Types of components:
  - Power supply
  - Hard disk drive
  - Motherboard
  - CPU
  - Expansion cards



The Motherboard

- CPU
- RAM
- Expansion cards and slots
- Built-in components

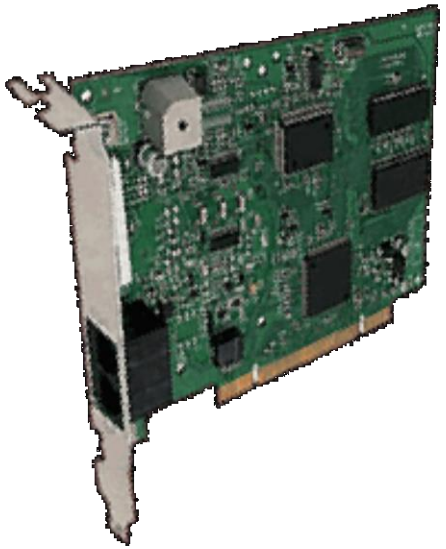


Central Processing Unit (CPU)

- Referred to as the “brains” of the computer
- Controls all functions of the computer
- Processes all commands and instructions
- Can perform billions of tasks per second

Expansion Cards

- Add functions
- Provide new connections for peripheral devices
- Common types:
  - Sound
  - Modem
  - Video (VGA)
  - Network (NIC)



Setting It All Up: Ergonomics

- Ergonomics: minimizing injury or discomfort while using the computer
- Steps to follow:
  - Position monitor correctly
  - Use adjustable chair
  - Assume proper position while typing
  - Take breaks
  - Ensure adequate lighting

Using proper equipment that is adjusted correctly helps prevent repetitive strain injuries while working at a computer.

Chapter Summary

1. What exactly is a computer, and what are its four main functions?
2. What is the difference between data and information?
3. What are bits and bytes, and how are they measured?
4. What devices do I use to get data into the computer?
5. What devices do I use to get information out of the computer?
6. What's on the motherboard?
7. Where are information and programs stored?
8. How are devices connected to the computer?
9. How do I set up my computer to avoid strain and injury?

The End

Next :

Chapter 3: Application Software: Programs That Let You Work and Play